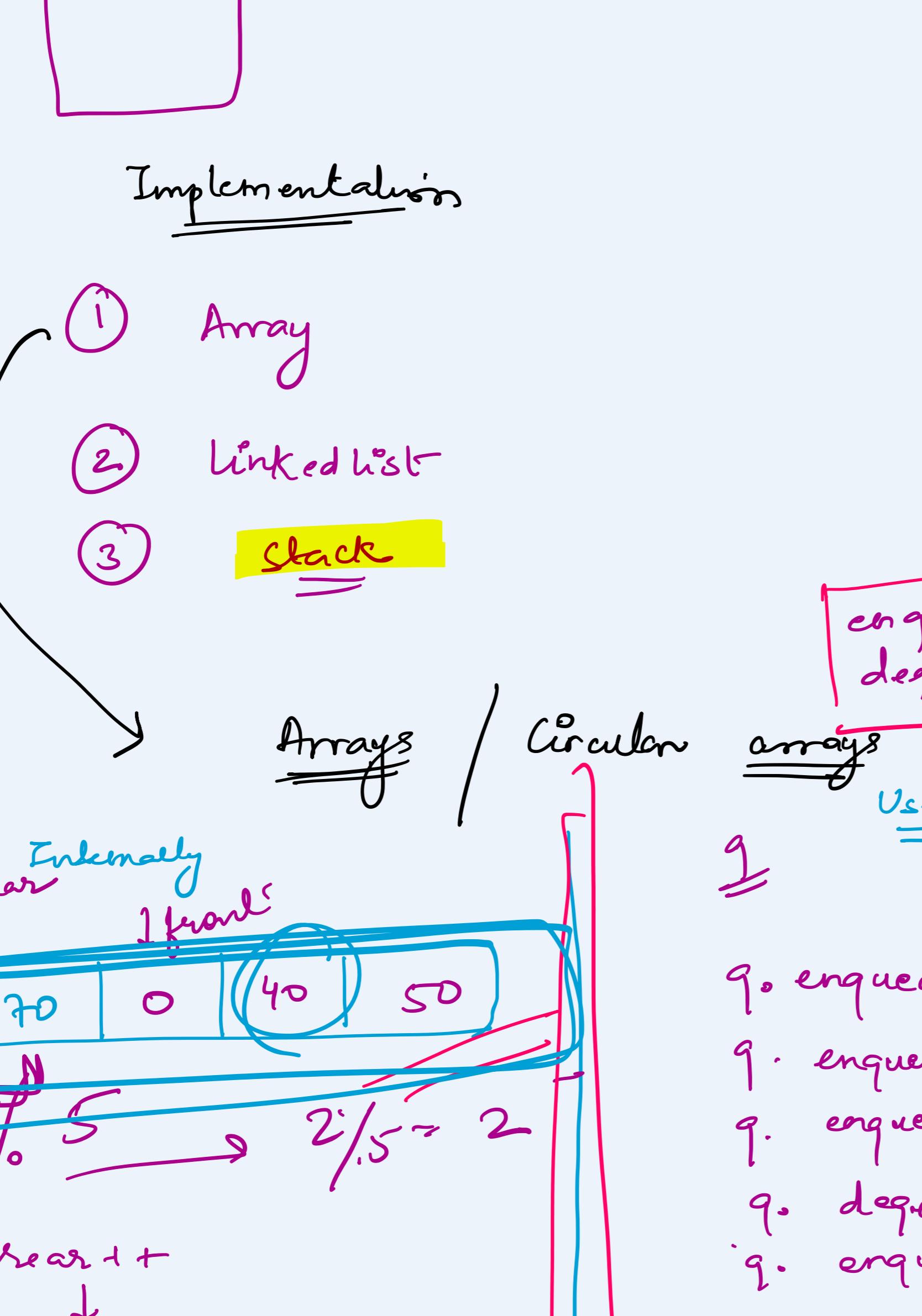


Queue

- enqueue [adding to queue]
- dequeue [removing from queue]

FIFO

Process in first out



Implementation

- ① Array
- ② Linked list
- ③ Stack

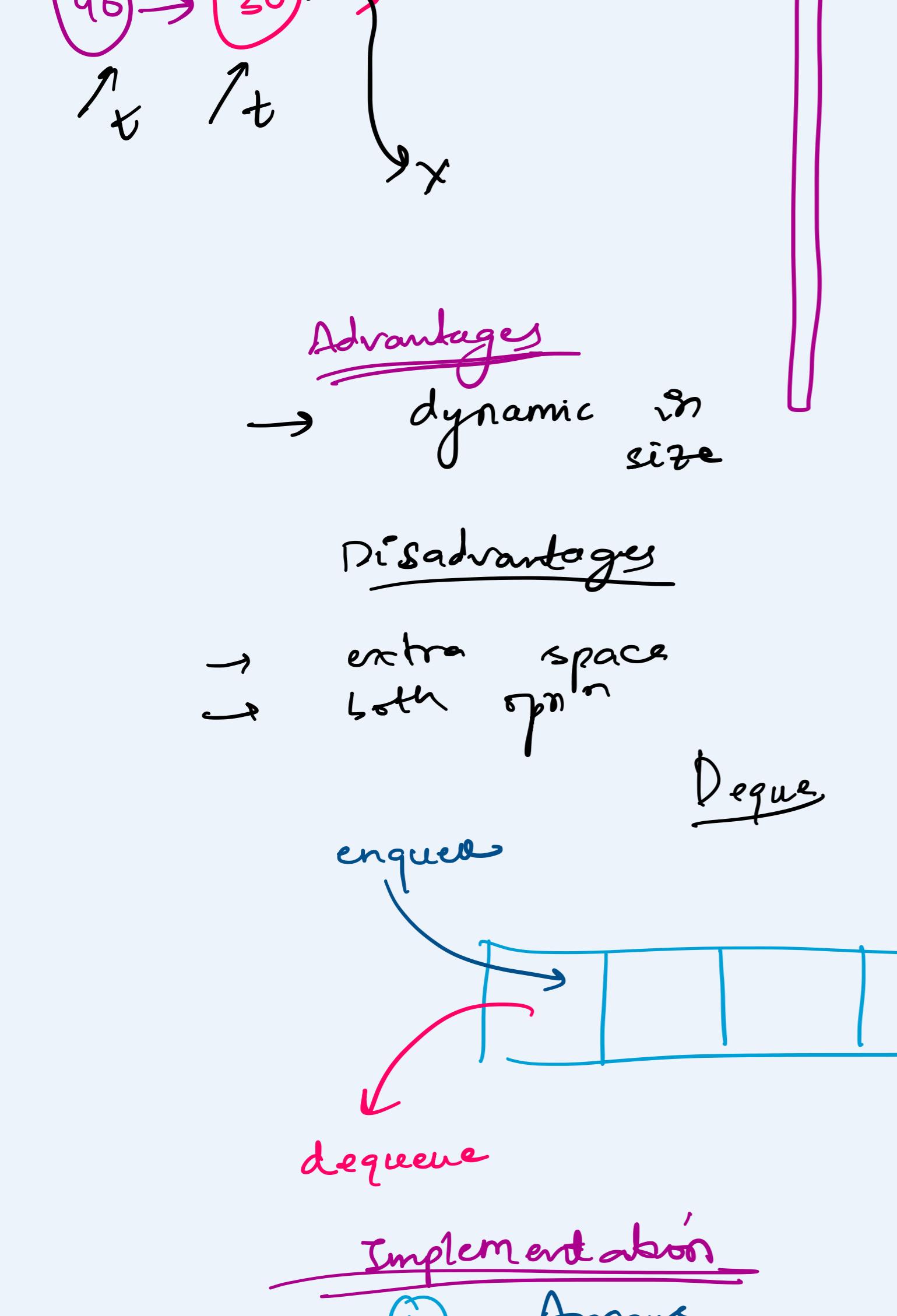
Arrays

Circular

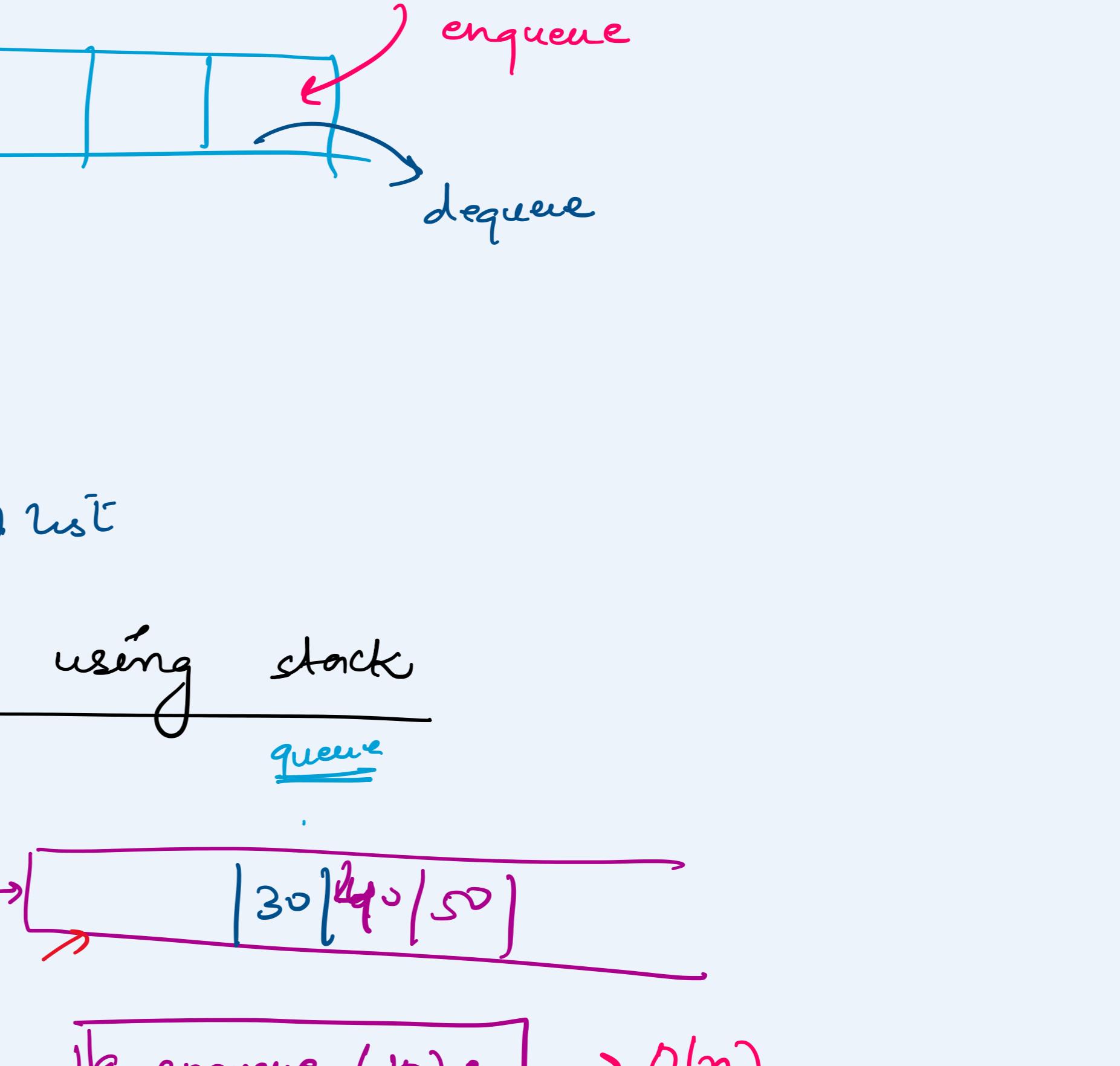
arrays

User

enq → O(1)
deg → O(1)



q.enqueue(10);
q.enqueue(20);
q.enqueue(30);
q.dequeue();
q.enqueue(40);
q.enqueue(50);
q.dequeue();
q.enqueue(60);
q.enqueue(70);
q.dequeue() → 30



Linked list

enqueue → add at head

dequeue → remove at last

head

tx

tx

User

q.enqueue(10);
q.enqueue(20);
q.enqueue(30);
q.enqueue(40);
q.dequeue() → 10

q.enqueue(50);
q.dequeue() → 10

q.enqueue(60);
q.dequeue() → 10

q.enqueue(70);
q.dequeue() → 10

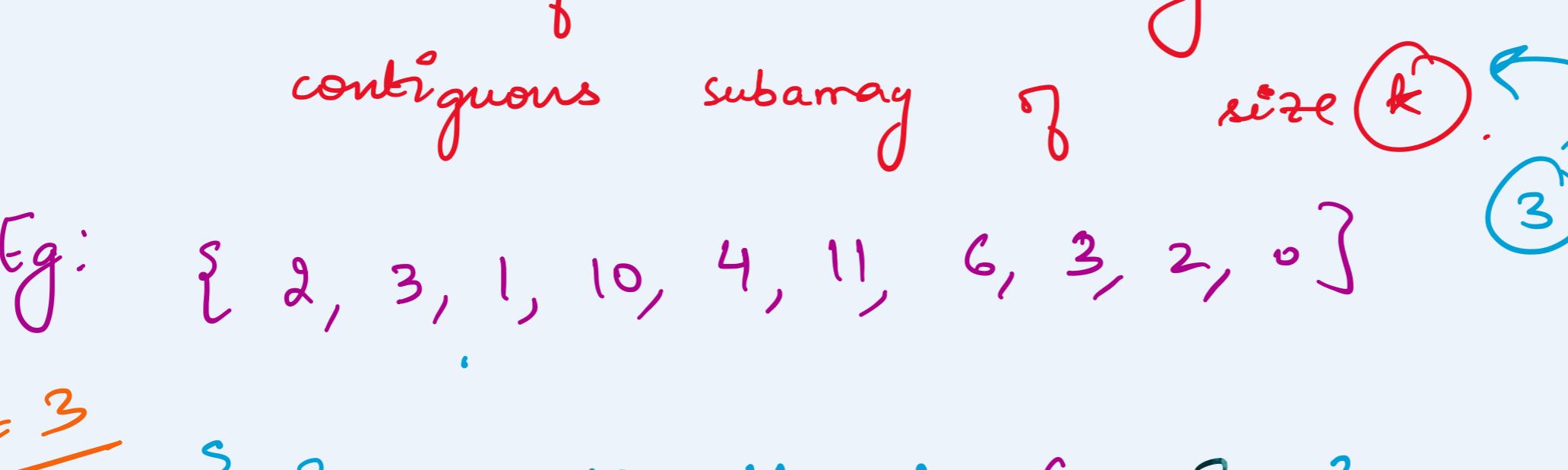
Advantages

→ dynamic in size

Disadvantages

→ extra space
both opn

Deque



Implementation

- ① Arrays
- ② Doubly linked list

* Implement queue using stack

stacks

queue

s1 [50 | 40 | 30]

s2 []

q → [30 | 40 | 50]

[q.enqueue(10);] → O(n)

[q.enqueue(20);]

[q.enqueue(30);]

[q.dequeue(); → s1.pop();]

[q.enqueue(40);]

[q.enqueue(50);] → O(1)

11

7, -10, -4

7, -10, -4

-10, 11, 11

7, 7, 7, 11, 11, 6, 3

if

y <= x

if y > x

deque

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if

y <= x

7, 7, 7, 11, 11, 6, 3

if

y > x

7, 7, 7, 11, 11, 6, 3

if